

CLAIMS

1. A semiconductor apparatus comprising a substrate, a semiconductor device formed on said substrate, and a protective film for sealing said semiconductor device, said semiconductor apparatus further comprising:

a first conductive layer in contact with a back surface of said protective film; and

a second conductive layer in contact with a front surface of said protective film.

2. The semiconductor apparatus according to claim 1, further comprising an insulating film of electrical insulation formed on said semiconductor device, said first conductive layer being formed on said insulating film.

3. The semiconductor apparatus according to claim 1, wherein said semiconductor device includes an outermost electrode layer as said first conductive layer.

4. The semiconductor apparatus according to any one of claims 1 to 3, wherein at least one of said first conductive layer and said second conductive layer is patterned into stripes.

5. The semiconductor apparatus according to any one of claims 1 to 3, wherein said first conductive layer and said

second conductive layer are patterned into stripes so as to cross each other.

6. The semiconductor apparatus according to any one of claims 1 to 5, further comprising:

a first electrode terminal in connection with said first conductive layer; and

a second electrode terminal in connection with said second conductive layer.

7. The semiconductor apparatus according to claim 6, wherein said first and second electrode terminals are formed on a peripheral part of said substrate, said peripheral part being located outside an area in which said semiconductor device is formed.

8. The semiconductor apparatus according to claim 6 or 7, wherein at least either one of said first electrode terminal and said second electrode terminal is made of a plurality of electrode pieces arranged at predetermined intervals along a peripheral part of said substrate.

9. The semiconductor apparatus according to any one of claims 1 to 8, wherein said semiconductor device includes an electroluminescent device.

10. A method of manufacturing a semiconductor apparatus for

detecting a defect within a protective film which seals a semiconductor device formed on a substrate, said method comprising the steps of:

(a) forming a first conductive layer;

5 (b) forming a protective film for covering said semiconductor device on said first conductive layer;

(c) forming a second conductive layer on said protective film; and

10 (d) measuring electrical conduction between said first conductive layer and said second conductive layer, and detecting a defect within said protective film based on the measurement result.

11. The method of manufacturing a semiconductor apparatus
15 according to claim 10, further comprising the step of, after a defect of said protective film is detected in said step (d), forming a repair layer for covering a surface of said second conductive layer corresponding to at least a region of and in the vicinity of the detected defect of said protective film.

20 12. The method of manufacturing a semiconductor apparatus according to claim 10 or 11, further comprising the step of forming an insulating film of electrical insulation on said semiconductor device, and wherein said first conductive layer
25 is formed on said insulating film in said step (a).

13. The method of manufacturing a semiconductor apparatus

according to claim 10 or 11, wherein said semiconductor device includes an outermost electrode layer as said first conductive layer.

5 14. The method of manufacturing a semiconductor apparatus according to any one of claims 10 to 13, wherein said first conductive layer is patterned in stripes in said step (a).

10 15. The method of manufacturing a semiconductor apparatus according to any one of claims 10 to 14, wherein said second conductive layer is formed in stripes in said step (c).

15 16. The method of manufacturing a semiconductor apparatus according to any one of claims 10 to 13, wherein said steps (a) and (c) include patterning said first conductive layer and said second conductive layer in stripes so as to cross each other.

20 17. The method of manufacturing a semiconductor apparatus according to any one of claims 10 to 16, wherein: said step (a) includes forming a first electrode terminal in connection with said first conductive layer; and said step (c) includes forming a second electrode terminal in connection with said second conductive layer.

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18. The method of manufacturing a semiconductor apparatus according to claim 17, wherein said step (d) includes:

measuring electrical conduction between first and second probes, said first probe being in contact with a surface of either one of said first electrode terminal and said second electrode terminal, while scanning said second probe in contact with and across a surface of the other of said first electrode terminal and said second electrode terminal; and

identifying a region of the defect of said protective film based on the measurement result.

19. The method of manufacturing a semiconductor apparatus according to claim 17, wherein said step (d) includes:

measuring electrical conduction between first and second probes, said first probe being into contact with a surface of either one of said first electrode terminal and said second electrode terminal, while sequentially connecting said second probe to a plurality of predetermined points on a surface of the other of said first electrode terminal and said second electrode terminal; and

identifying a region of the defect of said protective film based on the measurement results.

20. The method of manufacturing a semiconductor apparatus according to any one of claims 17 to 19, wherein, in each of said steps (a) and (c), said first and second electrode terminals are formed on a peripheral part of said substrate, said peripheral part being located outside an area in which said semiconductor device is formed.

21. The method of manufacturing a semiconductor apparatus according to any one of claims 17 to 20, wherein said step (a) includes forming a plurality of electrode pieces as said first
5 electrode terminal, said electrode pieces being arranged at predetermined intervals along a peripheral part of said substrate.

22. The method of manufacturing a semiconductor apparatus
10 according to any one of claims 17 to 21, wherein said step (c) includes forming a plurality of electrode pieces as said second electrode terminal, said electrode pieces being arranged at predetermined intervals along a peripheral part of said substrate.

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23. The method of manufacturing a semiconductor apparatus according to any one of claims 10 to 22, wherein said semiconductor device includes an electroluminescent device.